

“HOUSE OF SILVER MOBILE APPLICATION (HOSAPP): Embrace  
The Art of Silver Handicraft “

By

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Under Supervision of

**Associate Prof. Dr. Mohd Fadzil Hassan**

A Final Dissertation submitted to the

Information and Communication Technology Program

Universiti Teknologi PETRONAS

In partial fulfilment of the requirement for the

BACHELOR (Hons) OF TECHNOLOGY (BUSINESS INFORMATION SYSTEM)

Universiti Teknologi PETRONAS

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## **CERTIFICATION OF APPROVAL**

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Approved by,

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(Associate Prof Dr Mohd Fadzil Hassan)

UNIVERSITI TEKNOLOGI PETONAS  
TRONOH, PERAK  
September 2015

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work in my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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Tuan Iskandar Maha Aziz Bin Tuan Ismail

## **Abstract**

“To know is to love”, it is a best idiom to illustrate the need of awareness creation in attracting attention towards a subject. As such, this project focused on the study, design, development and deployment of mobile application as a medium to create an awareness and further attraction toward House of Silver; a niche retailer of silver handicraft. In addition, as cited by Lavidge and Steiner in an article entitled “A Model for Predictive Measurements of Advertising Effectiveness”, effective marketing is to create the awareness of the product. As it is, House of Silver has a hard time to market and attract buyers due to lack of silver-value knowledge among current consumers. Therefore, the objective of this project is to solve the above mentioned issue by utilizing the use of mobile application in creating consumer awareness and attraction toward House of Silver merchandise.

## **Acknowledgement**

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Other than that, I would like to thank my parents for giving me the moral support along the completion of my final year project. Without their support, I would not make it this far in completing the whole final year project. Last but not least, thank Allah for giving His strength in solving all the challenge in this final year project.

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## **Chapter 1 Introduction**

### **1.1 Background of Study**

House of Silver is a niche silver handicraft retailer. With business located in Kuala Lumpur, the heart of Malaysia, House of Silver invests a high sum of capital in silver handicraft industry to fill in the market demand. Investment in silver handicraft industry is associated with high risk as the market demand is inconsistent that rely on a focused and targeted potential buyers. Most of the buyers are group of collectors who really understood and know the value of art in those silver handicrafts.

Furthermore, House of Silver is owned by a Kelantanese businessman who has high passion in business. Tuan Haji Ismail has started the silver handicraft business since 80's century as a niche marketer who explores the world to serve the potential consumers. In early 90's, he managed to open his first land outlet in Central Market Kuala Lumpur selling silver handicraft locally made in Malaysia by silversmiths in Kelantan.

However, House of Silver faces numbers of difficulties in marketing and commercializing their silver merchandises. Besides, House of Silver supply chain is also affected as lower demand of the product force some of silversmiths to quit the job.

Apart from that, as part of their marketing strategy, House of Silver has also invested in developing a web-based business to further enhance their business and meet the potential consumers.

Last but not least, as a niche business in silver handicraft industry, House of Silver is envisioned to further their silver handicraft business to international level. However, their first kick off plan is to nurture the community on the silver handicraft value specifically in local level before moving to international level.



## **1.2 Problem Statement**

*“How to help House of Silver to create silver product awareness among their targeted consumers?”*

As per statement above, it is generally known that the major difficulties that faced by House of Silver is to commercialize their product as there are lack of product-knowledge among the society.

Despite investing in web-based marketing, House of Silver is still unable to attract the consumers' majority. They have a business website; yet, it is rarely being hit as there are very few consumers well-versed on silver products. Selling silver handicraft is unlike selling gold jewellery. Even though silver and gold both are luxury items, yet silver product-knowledge is not embedded in the consumer mind like gold does.

Therefore, the most appropriate plan is to educate the society and create awareness on the art and value of silver handicraft in order to attract their attention while increasing the market profit.

## **1.3 Significance of Project**

The project will significantly impact the silver industry stakeholders. Firstly, on the vendor side, the project will help them in term of marketing their silver merchandise in which the project is to leverage the current trend of methodology in meeting the consumers' majority, which is via mobile application. Indeed, as cited by Stadd (2013), currently there is more than third quarter of the community having smartphone and using it almost all the time. Hence, it can be concluded that majority of the consumers having a smartphone and able to use this proposed project effectively. It is to expect that the consumer that owns a smartphone will able to download this mobile

application and get exposure to the silver handicraft information. Thus, the project is expected to significantly help to create a great awareness on the larger community to the silver handicraft value and knowledge.

On the other hand, the project is expected to significantly benefits consumers in reaching and learning silver handicraft knowledge conveniently. As the usage of smartphone has become the in-thing today, consumers are preferred to do almost everything with their gadget; include learning or getting any source of information.

Lastly, the project is expected to be the kick-off of viewing a technology in different perspective. There will be more new application of mobile application in the future to further optimize the mobile application usage and bringing the life of mankind to the next level.

#### **1.4 Objective of Project**

Given the above-mentioned problem statement, the project is focused on the study, design and development of a knowledge-based mobile application for House of Silver to create awareness and attract the community of their targeted market on the silver handicraft merchandises. By exploiting the current technology and trend, the project goals are mainly to help a local niche retailer like House of Silver to boost up their marketing strategy and generating more profit.

Following are the objectives of the project:

1. To gather and categorize Silver Handicraft knowledge information
2. To study and analyse the requirements to develop the Mobile Application to accommodate the needs of the silver-handicraft industry by focusing on House of Silver as the case study

3. To develop a knowledge-based Mobile Application as a marketing tool for House of Silver to create customer awareness
4. To validate and test the Mobile Application to ensure it is successfully implemented

### **1.5 Project Scope**

To fulfil the project objectives and ensure the project being realistic, project scope needs to be setup and firmly documented at the early stage to ensure it is able to be delivered within the given time frame.

As for this project, the scopes are breakdown into several items as per below:

#### Mobile Application Design Layout

- ✓ User friendly with knowledge-based layout
- ✓ Provide sections for knowledge feed and videos

#### Features

- ✓ Display fruitful and interactive knowledge and media with regards to the House of Silver merchandise
- ✓ Provide an inquiry section form where user can drop questions on any matters pertaining to the House of Silver products.

#### Content

- ✓ Information knowledge and media about House of Silver merchandise and silver handicraft

#### Platform

- ✓ Android platform

## **1.6 Relevancy of Study**

The relevancy of the project is breakdown to several perspectives as per below:

1. Vendor [House of Silver]

The study is expected to help House of Silver in improving their sales by creating awareness among their targeted market and attract them to buy their silver merchandise. Besides, the study is about to leverage the current IT-based solution in enhancing House of Silver business marketing.

2. Consumer

On the consumer perspective, the study is expected to bring convenient to consumer to reach and learn silver handicraft history and knowledge. In fact, the study is fitting the current trend of using smartphone.

3. Mobile Application

The study is about to bring the usage of mobile application to the next new level as a source of creating awareness on a particular subject. With this project, it can be further demonstrated that the developed mobile application can aid human in different wide perspectives, particularly within the context of silver handicraft industry.

## **1.7 Feasibility Study**

The feasibility study is critically essential to be done in the initial phase of the project in order to ensure the project is realistic and possible to be conducted. This study can help to smoothen the development cycle of the project. The feasibility study will be done in four perspectives as below:

### Technical Feasibility

From the technical perspective, the study is feasible as the technical part of it is only on developing the mobile application during the implementation phase. It is expected to be possible as the author has the programming knowledge in developing the mobile application.

### Economic Feasibility

Economically, the study is expected to incur a minimal cost as there are numbers of free online software to develop a mobile application. Besides, the hardware that will be used in the study is only a personal laptop and a smartphone; which the author will be using his personal laptop and smartphone.

### Scope Feasibility

The scope that has been listed out during the initial phase of the project is possible to be achieved. The study scope is focusing on developing a mobile application that will contains the information about the business merchandise knowledge and expected to create awareness on the merchandise among the targeted market. Therefore, the scope is niche enough and is realistic to be achieved.

### Time Feasibility

Time is one of a main constraint of the study as the study need to be achieved in 28 weeks' time. Hence, the author has developed a project Gantt chart in order to keep track on the study progress so that the project can be delivered within the given timeframe.

## **Chapter 2 Literature Review**

Literature review is essential in a research project. It refers to reference made to scholarly papers, which include the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. As for this project, the literature review will cover three elements namely Mobile Apps for marketing purpose, Mobile Apps platform and lastly Mobile Apps interface.

The first section of this literature review entitled Mobile Apps for marketing purpose is to study the need and usage of Mobile Apps in marketing a business. Then, moving to the next section of the literature review, a further study is done on the Mobile Apps platform to gather all the important information pertaining to the Mobile Apps platform that will be leveraged in this project.

Last but not least, the final part of the literature review is focusing on the interface of Mobile Apps. This final section is to study the important elements that need to be featured in the Mobile Apps interface.

### **2.1 Mobile Application for Marketing Purpose**

According to Lavidge and Steiner (1961), the ultimate function of advertising is to help produce sales [1]. However, they also added that all advertising is not, should not, and cannot be designed to produce immediate purchases on the part of all who are exposed to it. Immediate sales results are, at best, an incomplete criterion of advertising effectiveness. In other words, the effects of much advertising are "long-term." This is sometimes taken to imply that all one can really do is wait and see — ultimately the campaign will or will not produce. This process must be measured in order to provide a comprehensive evaluation on the effectiveness of the advertisement.

On the other hand, the most essential statement to be highlighted in Lavidge and Steiner Model is “advertising may be thought of as a force, which must move people up a series of steps: Near the bottom of the steps stand potential purchasers who are completely unaware of the existence of the product or service in question...”; which clearly indicated that an effective marketing shall start at the bottom steps which to create consumer awareness toward the product in order to convert those potential consumer into sales [1]. As such, it is applicable to current silver handicraft industry which is one of the untapped industries locally and globally. It is supported by the House of Silver sales projection which shows an unfavourable graph on silver handicraft sales in Malaysia. In addition, House of Silver is facing a hard time in marketing their silver handicraft due to the failure in tackling the fundamental element of effective marketing model as discussed by marketing scholars; Lavidge and Steiner, on creating consumer awareness toward the product existence and value.

Moreover, as the world is moving rapidly toward the era of sophisticated Information Technology (IT), technology is no longer considered as luxury wants, instead it has become a need in people daily routines. Back to the time of our ancestors, those days’ children were playing with doll which is a huge contrast with our current generation who prefers tablets and advance gadgets. It is clearly a sign that the usage of technology has played a vital role in human development. Indeed, the current trend of technology has moving towards a mobile based where there are almost anything can be done on a click at an internet-connected mobile. Nielsen Malaysia had predicted the growth for mobile-based market in the country to reach more than 85% by middle of 2015 [2]. By looking at the opportunity, it triggers more companies to venture into the smart-phones market. For instance, ZTE Corporation, a leading global provider of telecommunications equipment and network solutions, had come out with their strategic plan to develop a low to middle-end smartphone market to make it more affordable for Malaysians to enjoy using smartphones as well [3].

Moreover, Nielsen 2012 reported on Smartphone Insights that Malaysia smartphone or mobile-based penetration rate is at a surprising pace of which more than a third (36%) are aged 25 to 34. They surveyed more than 35,000 mobile users in 23 countries and the result shows that those who plan to upgrade their phones in the next six months, 79% of them plan to buy a smartphone [4]. This proves as time flies, smartphones market is getting bigger and bigger. In conclusion, it is ideal to say that the usage of mobile application is an excellent marketing approach to boost up House of Silver sales. This is because there is undoubtedly a huge crowd of smartphone users who are potentially to be House of Silver potential customers. The idea is to leverage on mobile application to trigger the product awareness into those potential customers.

## **2.2 Mobile Application Platform**

Smartphone is a type of mobile phone that has the ability and functionality that is “able to perform many of the functions of a computer, commonly having a relatively large screen and an operation system that capable of running general-purpose applications” [5]. On the other hand, PC mag.com defined smartphone as “a cellular telephone with a built-in applications and internet access” [6]. Collectively there are many different perceptions on the smartphone, yet, smartphone basically is a mobile phone that can support mobile application based on the operating system of the phone. There are numbers of operating systems namely Android, iOS, Blackberry and etc. Each operating system has its own line of applications. For instance, a smartphone with Android OS can only support Android applications that can be downloaded from Google Play Store. Similarly, iOS smartphone can only support iOS application that listed in App Store. Moreover, the features of smartphones are rapidly evolved following the advancement of technology. Currently, almost all smartphones are based on touch screens to allow comfortable and higher control in accessing the devices.





Figure 1: Types of Mobile Operating System

Furthermore, the mobile based trend is getting popular from day to day in this matured world. Azam et al. (2012) highlighted that more than one third of Malaysia smartphone users spend more time in accessing smartphone applications [7]. From that statistic, it can be said that people are using smartphones much of the time in their daily routine and the statistics seem to increase along with the revolution of smartphones. Obviously, there are tons of reasons behind the statistics. One of it is the versatile ability of smartphone in supporting variety of applications that are essential in human daily routine. Besides, the social networking abilities such as e-mail, instant message, video calls which in the past people do in different platform added the value into the use of smartphones. In fact, the invention of smartphones has eased the human communications and networking.

Apart from that, as cited by John Petroff (NA) in Demand and Supply; “the market demand and supply moving toward each other to meet the market equilibrium” [17]. In other word, the law of market equilibrium stated that the supply of a particular product or services will increase as the demand of that particular product or services increases. Hence, back to the increasing trend of smartphone usage, it is denoted the arising demand of smartphones has attracted more supply for smartphones. Hence, there are growing numbers of different smartphone developers competing in supplying smartphones to fill the market demand. Not to mention, the smartphone phenomena has also created a lot of job opportunities whereby there are hundreds of new mobile

applications invented each year. In fact, it is reported that there are about a million applications in the Apple App Store. With the numbers of application covering all aspect of life needs, the use of smartphone has eased the daily activities.

According to Gartner; the world leading IT research and advisory company, based on the current trend showing that Android operating system platform is and will be the most familiar and popular mobile OS in the next half decade [8]. To add, it is forecasted that Android will control almost 50% of the total market share [8]. The figure below illustrates the forecast made by Gartner.

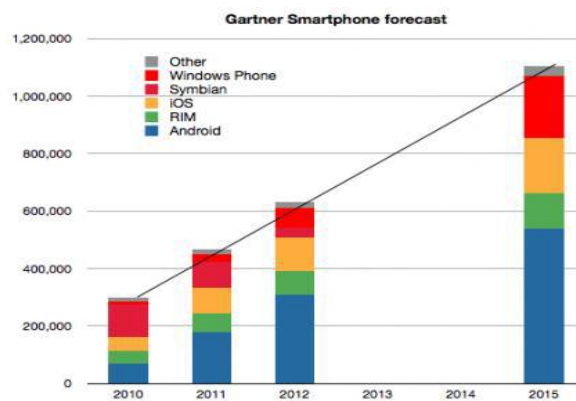


Figure 2: Gartner Smartphone Forecast

As portrayed by the graph above, Android operating system platform is expected to lead the market due to the fact that most of smartphones available in the market are made compatible with the Android platform. In contrast, the likes of iOS and Blackberry operating system are both designated to run with only their own (ie. Apple and Blackberry). This becomes the main reason why the usage of Android operating system platform has surpassed its other competitors. Currently, the reign of Android-based platform involves millions of smartphones that bridging the power of Google into our hands [9].

Moreover, the Gartner statistics is consistent with the International Data Corporation (IDC), Worldwide Quarterly Mobile Phone Tracker, in which they reported that eight

out of ten smartphones shipped in the first quarter of 2012, was accounted for smartphones that are compatible with the Android and iOS mobile operating system [10]. Indeed, these operating systems held shares of estimated 60% and 25% respectively of the total of 150 millions of smartphones shipped in the same period [10]. Based on the above statistics, it is clearly indicated the reign of Android operating system platform which is currently controlled more than half of all smartphones shipments and becoming the leader of the smartphone operating system.

## **2.3 Mobile Application Interface**

### **2.3.1 User Centred Design**

As stated by Wikipedia (2015), “User-centred design (UCD) is a process (not restricted to interfaces or technologies) in which the needs, wants, and limitations of end users of a product, service or process are given extensive attention at each stage of the design process” [11]. The term ‘user-centred design’ originated in Donald Norman’s research laboratory at the University of California San Diego (UCSD) in the 1980s and became widely used after the publication of a co-authored book entitled: User-Centred System Design: New Perspectives on Human-Computer Interaction [12]. It is a philosophy that places the person as opposed to the ‘thing’ at the centre; it is a process that focuses on cognitive factors such as memory, perception, learning and problem solving as they came into play during human interaction with things. User centred design can be characterized as a multistage problem solving process requires interface designers not only to analyse and foresee user behaviour towards the interface, but as well as to examine the validity of their assumptions with regards to users behaviour in the real world. Such testing is necessary in order to learn and understand intuitively on user first experience on the design. User centred design is aimed to tackle those questions to drive the development and design [13].

Indeed, an effective user centred design is vital for any mobile application and software. The essence of a user centred design is lies within its ability to communicate with the user in a way that allows a thorough and simple presentation of the sites content and navigation conventions. The most obvious difference from other interface design philosophies is that user-centred design tries to optimize the user interface around how people can, want, or need to work, rather than forcing the users to change how they work to accommodate the system or function.

Last but not least, there are several important principles and techniques to design and develop an effective User Centred Design that will work in conjunction with each other. These principles are mainly concerned to create design integrity and functional stability [14]. The following sections will cover each of the principles namely Navigation Aids, Simplicity and Consistency and Direct Access to Information.

### **2.3.2 Navigation Aids**

First and foremost, all application and Web design should take into account that when creating an effective application based user centred design, the first importance principle is a clear and consistent navigation aids. As users go through an application, they will always expecting a simple and easy navigation with clear command to navigate within the application. Lynch and Horton (2002) in their article entitled “the Web Style Guide”, have highlighted that the most problematic issue in design is users who are lack of sense of where they are within the hierarchy of the site [14]. Hence, to overcome these lost visitors, the style guide suggests that the need of clear and consistent icon, graphic and identity scheme in interface design [14].

Apart from that, it is further supported by Grunwald (1997) who significantly believed that an effective application or website is the one which provide clear and easy navigation [15]. The site design should always allow users to prompt back to the home

page and other upper level pages easily. All these can be done using the Hyperlink that should be located at a consistent position on every page and can be seen and navigate easily.

### **2.3.3 Simplicity and Consistency**

The next principle of User Centred Design is working directly with the first principle in which it deals with simple, consistent and conventional design. Most of the time, application designers tend to overlook this issue in which they tend to develop an advance interface with multiple colours and attraction that can resulted in missing of the main basic requirements of the application. As such, this can lead to user confusion and decrease the application ease of learning. The site design should follow all conventions of layout and navigations that are already learned and familiar by the users.

Moreover, for a maximum functionality and legibility, the pages and application design should be built on a consistent pattern of modular units that all share the same basic layout grids, graphic themes, editorial conventions, and hierarchies of organizations [14]. In other word, designers should always keep the page lengths short and use text font, style and colours appropriately [15]. It is essential to keep in mind of these entire concepts while building a user centred design as all these attributes can lend the user some automatic familiarity which can trigger a favourable first impression on users.

#### **2.3.4 Direct Access to Information**

Last but not least, the final important principle is the direct access to information. It is significantly essential to an intelligent user centred design that the sought information can be obtained in the fewest possible numbers of clicks. As so, to achieve an efficient direct access requires the designer to create an efficient hierarchy of content in order to minimize the number of steps required for user to find what they are looking for. The Design hierarchy should allow for real content to be only a click or two away from the site's main pages [14]. A user centred design needs to be in a well-organized and structured in order to communicate clearly with the intended user [15]. Failure in doing so, will trouble the users to reach the intended information in a reasonable amount of time. Hence, it is unfavourably creating a bad impression on the user behaviour towards the application design.

## **Chapter 3 Methodology**

This section will discuss on the project methodology components which comprises of research methodology, system methodology, schedule milestone and Gantt chart and lastly the tools and equipment.

### **3.1 Research Methodology**

There are two research methodologies that have been carried out namely interview and questionnaires survey. The results of both methods are further explained in Chapter 4: Results & Discussion.

#### **3.1.1 Questionnaires Survey**

Questionnaire surveys have been distributed among the UTP community and a group of 30 potential consumers' feedback have been collected and analysed. The survey is conducted through online in a Google form that been distributed to several UTP Facebook groups. The survey is consist of 10 close-ended questions with 2 questions are covering the demographic information and the remaining 8 are research related questions.

#### **3.1.2 Interview**

On the other hand, an interview has been conducted as the owner of House of Silver; Tuan Azizah Tuan Mat, has been interviewed with a set of open-ended questions to further understand the business process and the merchandise information in order to feed into the HOSAPP mobile application.

### 3.2 System Methodology

The research methodology that will be applied in this project is Rapid Application Development (RAD). The method is selected as it is the most appropriately suitable for a project with a short timeframe (8-months) in which this method allow the study to evolve upon the changing in requirement. Indeed, RAD merges various structure techniques, especially data-driven information engineering with prototyping techniques that is able to accelerate a system development [16]. Hence, it helps researcher to quickly adapt to the changing environment and achieve the project objective in scheduled time.



Figure 3: Rapid Application Development Methodology

As illustrated in the figure above, Rapid Application Development methodology consists of four stages. The four stages are Planning, Analysis, Design and Implementation. Each phase has its own key milestones to be achieved. The following sections will explain those phases in detailed.



## **Planning Phase**

Planning phase is the first stage of the project. It is significantly important as the researcher need to wisely decide on selecting and proposing a project proposal to be working on. The project proposal needs to be submitted to obtain approval before the project can be started. Upon approval, the next step is to identify the problem statement of the project. It is significantly important that the problem statement needs to be clearly defined and understood as it will be the prime root of the project. Without a strong and firm root, a tree is unlikely to be grown tall. Same goes to the development of a project, the root need to be clearly defined in order to have a clear and consistent objective and path.

Moreover, having a problem statement in hand, the researcher is required to pinpoint the project objectives and scope. Those project objectives, scope and requirements need to be documented and reviewed by the assigned supervisor. Before proceed with data gathering, a comprehensive discussion with the supervisor on the project requirements is held to obtain a finalized version of the project requirement to avoid any undesirable event that require to returned to planning phase. Moving forward, researcher will perform the pre-feasibility analysis to determine whether the project is realistic and achievable from the perspective of technical, economic, organizational, time and scope. If any of these perspectives are not met, the project objectives and scopes that have been defined earlier may need to be reviewed.

Last but not least, at the end of the planning stage, the researcher are required and expected to do the literature review by analysing the past work and information that relevant to the project topic and also come out with a specific schedule on the milestone to be achieved.

## **Analysis Phase**

After completing the planning stage, the next agenda is to gather and obtain all the necessary information and data to iterate the project requirement from the user point of view. Hence, in the analysis phase, the main objective is to gather all the current information and data to feed the project requirement. Despite the gathered literature review may have proven the relevancy of the project, it is significantly essential to have the most updated and current information to have a clearer view of the project. In fact, studying current information can further improvise the information content by tackling any existing current problem that is related to the topic.

The methodology that will be used in collecting those information is via distribution of survey of questionnaires and interviewing the targeted sample. In this case, the targeted samples are the House of Silver owner itself, several House of Silver customers and students of Universiti Teknologi PETRONAS. Upon obtaining all those information, the information will be analysed to list out the system requirement that will be applied in the design and implementation phase. Next, the researcher needs to study the current business process in order to stimulate the design in the next phase. As for this case, the researcher needs to observe and study House of Silver business process in order to come up with an appropriate design and framework of the mobile application.

## **Design Phase**

In the third stage of Rapid Application Development methodology, the researcher will start developing a new business process based on the gathered information from analysis phase by designing the related UML diagrams such as activity diagram, use case diagram and class diagram. All these diagrams are required to be as reference for designing of database, class and algorithm to be applied in the system.

Apart from that, after finish on the business process modelling part, the next process is to proceed to the technical design which be involving the sketching and designing the GUI of the mobile application. The technical design is also taking into account the design of the database and hardware that will be used to support the project implementation. Lastly, all those designs need to be reviewed and discussed among supervisor and stakeholders in order to obtain their verification and validation on the determined requirement.

### **Implementation Phase**

Implementation phase is the stage where all those information that gathered in previous stages are transformed into physical product that meeting all the determined requirement. In this final stage, researcher will begin to develop the application by adding up all the predetermined system functionalities into the GUI that been designed earlier in design phase.

Next, having the running application with all the required functionalities in hand, the application then deployed to the users. Several testing will be done in order to obtain the users' feedbacks and experiences for any require improvement.

Typically, in Rapid Application Development there are high possibilities the project to be returned to either analysis or design phase upon receiving any need in changes. Lastly, usually at the end of implementation phase that the prototype will be the final system, but, upon the decision made by the research committee whether to deploy the system.

### 3.3 Key Milestones

No	Deliverables/Activities	Schedule
1	Title Selection and Proposal Submission	Week 2
2	Project Approval	Week 4
3	Literature Review	Week 5
4	Survey and Data Gathering	Week 9
5	Process and System Modelling	Week 10
6	GUI Design	Week 10
7	Interim Report Submission	Week 11
8	Proposal Defence	Week 13
9	Develop Mobile Application (Coding)	Week 15
10	Mobile Application Completed	Week 22
11	Testing	Week 22
12	Technical Report Submission	Week 24
13	Final Dissertation Submission	Week 25
13	Viva	Week 28

Figure 4: Table of Key Milestone

### 3.4 Gantt Chart

Done	In progress	Upcoming

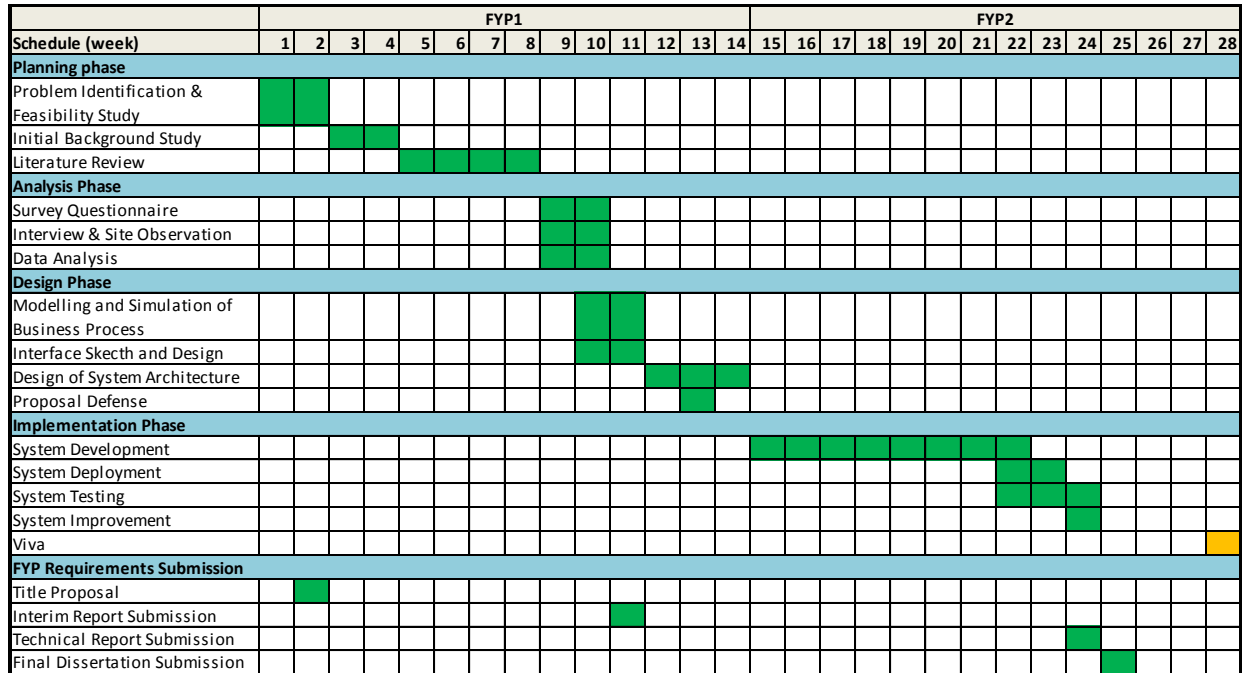


Figure 5: Gantt Chart

## **Chapter 4 Results and Discussion**

### **4.1 Data Gathering and Analysis**

Throughout the development of this project, both quantitative and qualitative data gathering method has been applied by the author in which the author has conduct a questionnaire surveys among the UTP students as well as interviewed an expert on silver handicraft to collect the necessary data to further support the development of the project.

#### **4.1.1 Quantitative Data Gathering**

As a source of quantitative data, questionnaire surveys have been distributed among the UTP community and a group of 30 potential consumers' feedback have been collected and analysed. The survey is conducted through online in a Google form that been distributed to several UTP Facebook groups. The survey is consist of 10 close-ended questions with 2 questions are covering the demographic information and the remaining 8 are research related questions. The collected results are further analysed and discussed as per below:

##### Smartphone & Mobile Application Usage

The first three questions of the survey are computing information on the smartphone usage and mobile application among the respondents.

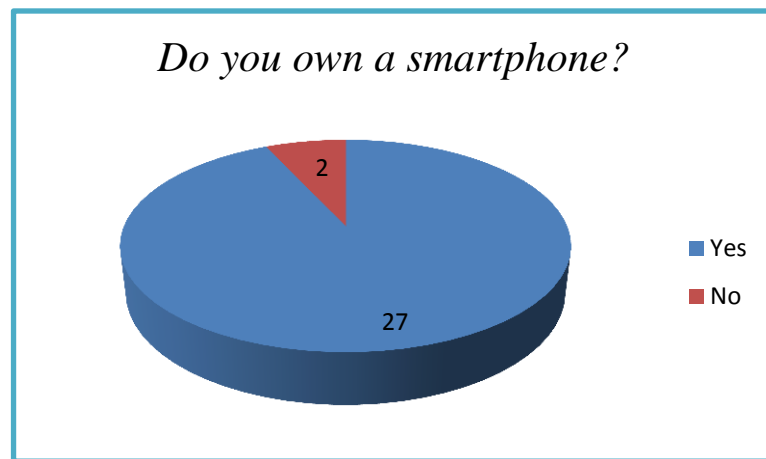


Figure 6: Survey Q1 Analysis (Pie chart)

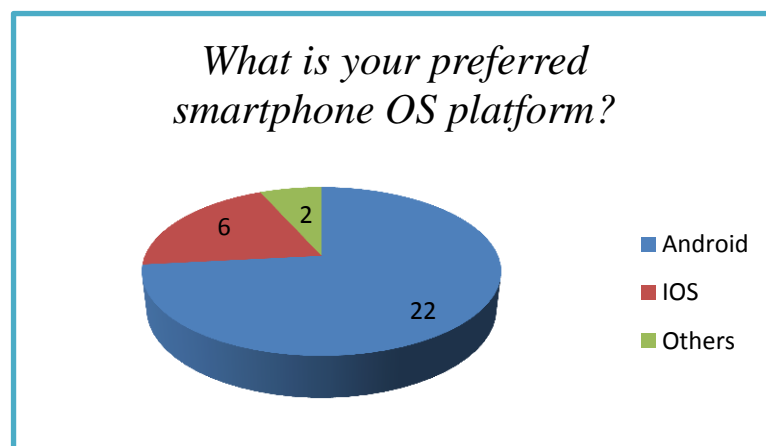


Figure 7: Survey Q2 Analysis (Pie chart)

Above figures are statistics of smartphone usage among the sample collected. Based on the figure 6, there are almost majority of the sample are using smartphone, which are 27 persons out of total 30 collected. From this result, it is significantly depicted that smartphone is famously being use by the majority of today society. On the other hand, about 73% of the respondents preferred Android as their smartphone operating system platform. Meanwhile, the rest of the respondents chosen iOS(20%) and others platform; which are Blackberry(3%) and Windows(3%) platform. Therefore, statistically Android platform is conquering the majority of the smartphone users' preference.

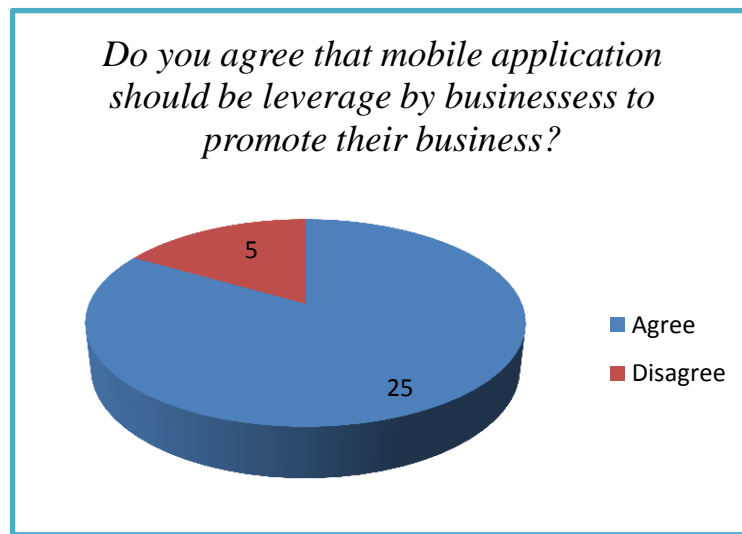


Figure 8: Survey Q3 Analysis (Pie chart)

Next, 25 respondents out of total 30 are consensually agreed that mobile application should be optimize by all businesses in enhancing their business process. From the data, we can assume that most of the smartphone users have the belief that mobile application usage can be further utilized in enhancing businesses performance.

#### Perception on Silver Merchandise & Expectation on HOSAPP mobile application

Meanwhile, the next 5 questions of the survey are collecting the perception of the respondents toward the silver merchandise as well as their expectation on the House of Silver mobile application (HOSAPP) features and functionality.





Figure 9: Survey Q4 Analysis (Pie chart)

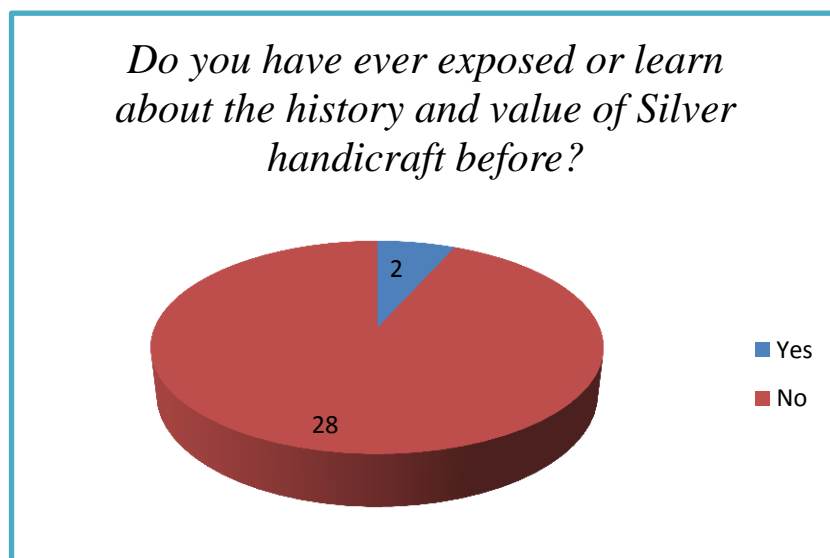


Figure 10: Survey Q5 Analysis (Pie chart)

Moving forward, the next section of the survey is collecting the perception of the respondents toward the Silver handicraft. Based on Figure 14 above, the pie chart clearly indicates that most of the respondents have never been purchased any silver merchandise before. This is because they have never been exposed to any silver handicraft knowledge and history before. As illustrated on pie chart above (Figure 10), only two respondents have experienced about silver handicraft history and value while

the rest numbers of respondents (93%) are totally in ignorance of silver handicraft history and value. Thus, we can conclude that most of these respondents are never been exposed to any of silver handicraft knowledge.

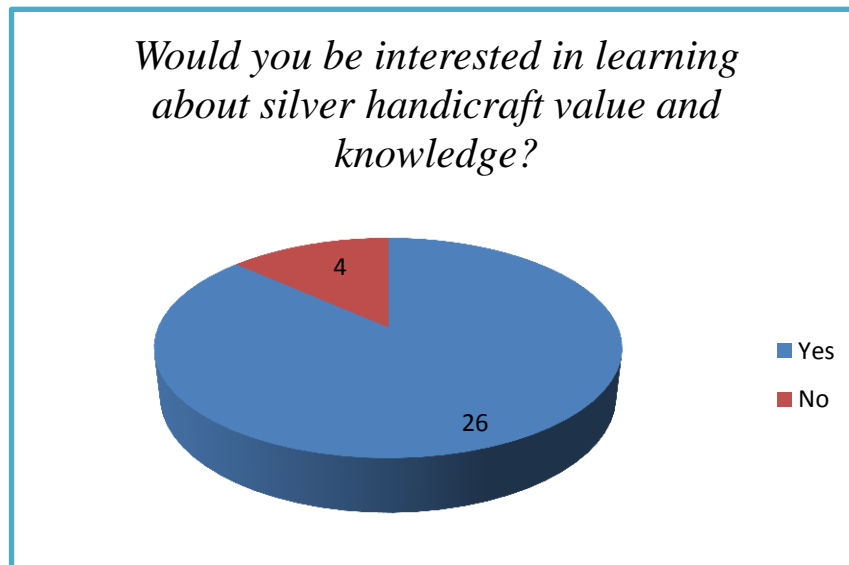


Figure 11: Survey Q6 Analysis (Pie chart)

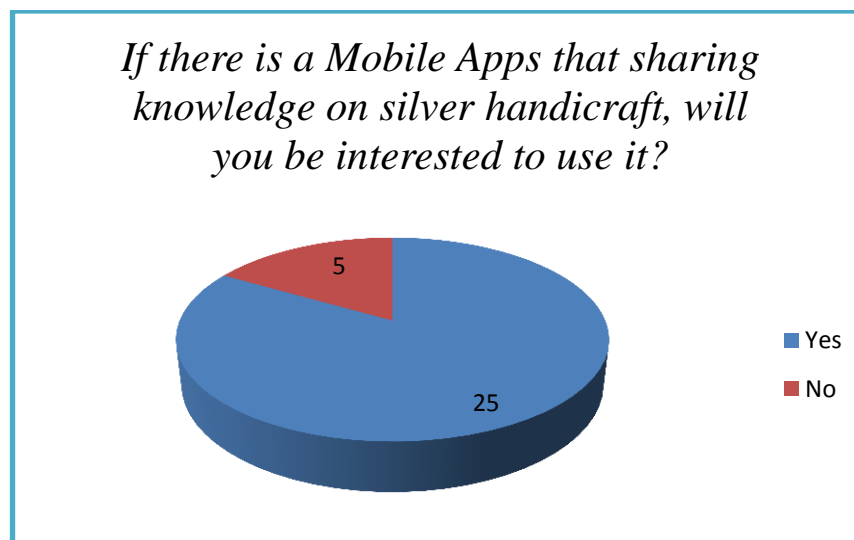


Figure 12: Survey Q7 Analysis (Pie chart)

Furthermore, majority of the respondents (26 persons out of 30 persons) are interested in learning the knowledge and history of silver handicraft. The data collected is represented on the pie chart on Figure 11 above. In fact, almost the same result is

collected on the next question in which most of them are interested in learning the silver handicraft knowledge and history through mobile application. Therefore, this collected data have significantly contributed to the relevancy of this HOSAPP mobile application study. Whereby most of the respondents (more that 80%) are interested in using the mobile application upon it is developed.

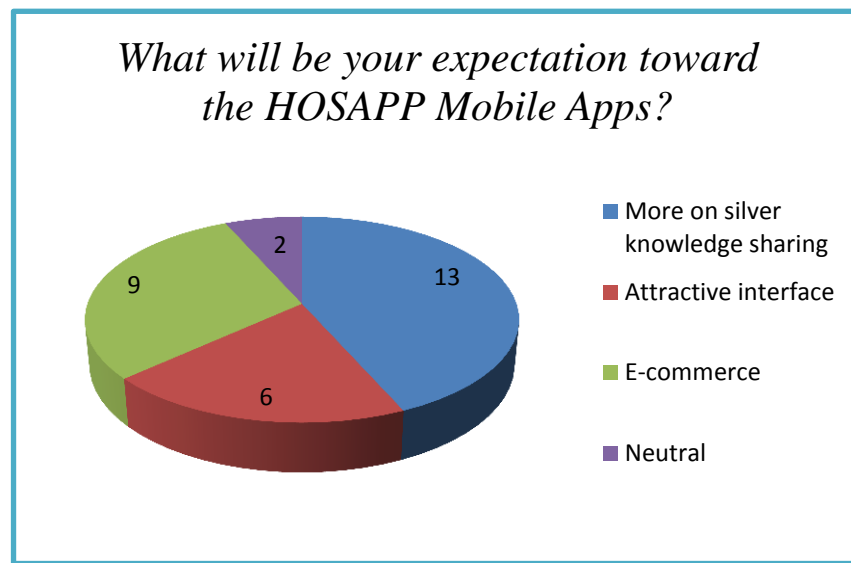


Figure 13: Survey Q8 Analysis (Pie chart)

Lastly, the last question of the survey is collecting the expectation of the respondents toward the features and functionality of the proposed HOSAPP mobile application. From the data collected, about 43% of the respondents expected the HOSAPP to provide more on silver knowledge related. In other word, they are expecting HOSAPP to be a reliable knowledge sharing platform on the Silver handicraft history and value. Meanwhile, about 30% of the respondents expect the mobile application should provide online sales of silver handicraft product (e-commerce). Next, other six respondents are voting on having a friendly and attractive user interface as their top priority on the HOSAPP mobile application. There are also two respondents who are

not having any thought or concern on the design of the mobile application. All these information is illustrated on the pie chart above (Figure 13).

#### **4.1.2 Qualitative Data Gathering**

On the qualitative data gathering part, the House of Silver owner; Tuan Azizah Tuan Mat, has been interviewed with a set of open-ended questions to further understand the business process and the merchandise information in order to feed into the HOSAPP mobile application. Below is the summary of the interview:

##### Interviewee's Profile:

- Name : Tuan Azizah Binti Tuan Mat
- Age : 50 years old
- Profession : Owner of House of Silver

##### Current Business Process

*“Would you mind to share about the House of Silver company background?”*

House of Silver current business process is a typical version of a common retail shop in which they have a shop lot selling their silver merchandise. Moreover, there is lack of IT-based solution being leverage by the vendor in which it is only limit to a company website and a cash machine. On the marketing point of view, the House of Silver current marketing approaches are only through their company website and promoter efforts. On the other hand, House of Silver is geographically advantage as the shop lot is located in strategic location which on the main entrance of the mall.

### House of Silver Sales and Customers Behaviour

*“How is the business doing?”*

Financially, House of Silver is still in a good standing as they is still generating revenue and profit. However, statically House of Silver sales are not consistent. In fact, the vendor itself cannot make any forecast on the sales pattern as most of the time their sales were depending on special orders coming from big companies who purchased the silver handicraft as corporate gifts on their company events.

Apart from that, House of Silver is also facing a hard time in convincing their potential customer to buy as most of the customers are not well-versed on the silver product. According to the House of Silver vendor, most of the customers back-out from their interest on any silver handicraft once they acknowledge the actual price of it. This is because most of the customers do not expect the silver handicraft would cost high price due to lack of knowledge on the silver handicraft value. Therefore, it is the main challenge for the House of Silver in selling their merchandise.



Figure 14: House of Silver Store

### Silver Handicraft Information

*“Would you mind to share on the details of your merchandise?”*

House of Silver merchandises are consists of silver made jewellery and decorative items. All of those merchandises are made of sterling silver. Sterling silver is an alloy of silver containing 92.5% by mass of silver and 7.5% by mass of other metals, usually copper. The reason of not using full per cent by mass of silver is because pure silver (99%) is generally too soft to be crafted into functional objects. Hence, the silver usually will be alloyed with other metals such as copper to strengthen its composition while preserving the appearance of the precious metal. Apart from that, according to the House of Silver vendor; Tuan Azizah Tuan Mat, the price of raw silver is around MYR 3000 per kilogram. Meanwhile, the cost of the silversmith to craft the silver into object is depending on the description of the desired object. However, generally the cost of silversmith will exceed the total price of raw silver being used. This is because the crafting process required a diligent of creative work that might take weeks to be done. Lastly, House of Silver merchandises are mostly produced locally. In fact, the company have an own factory producing the fine art of silver which located in east coast of Malaysia.



Figure 15: House of Silver Merchandises

## 4.2 System Requirements - UML Diagrams

### 4.2.1 Use Case Diagram

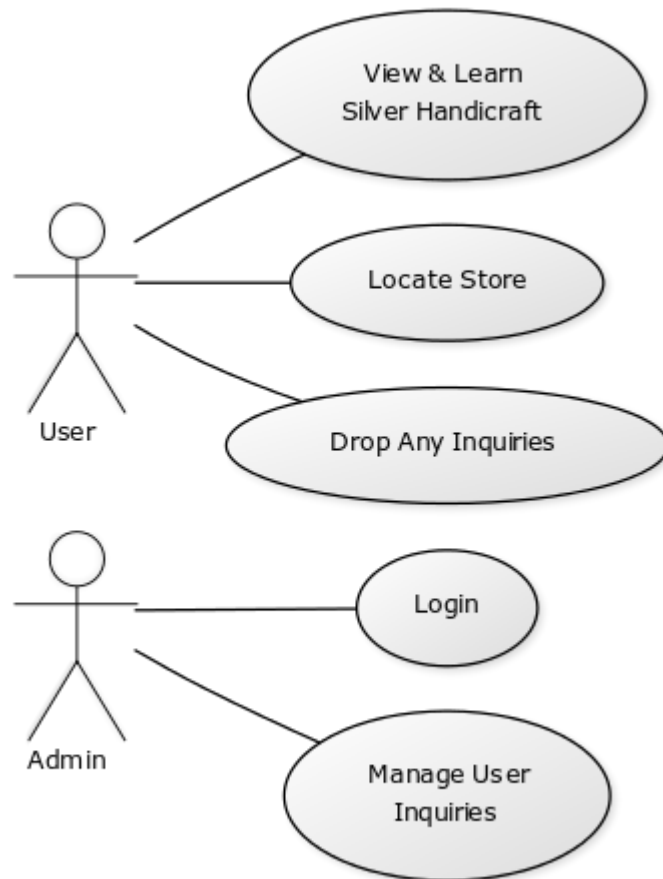


Figure 16: Use Case Diagram

According to Wikipedia (2015), use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases (functionalities) in which the user is involved.

Based on the use case diagram above, there are two actors who will involve with the mobile application functionalities (use cases) namely end-user and admin. Besides, it is also indicates the relationship between these two users and the mobile functionalities in which the user is involved.

#### 4.2.2 Activity Diagram

Activity diagram is divided into two which they are separated based on user and admin access view.

##### Activity Diagram (User View)

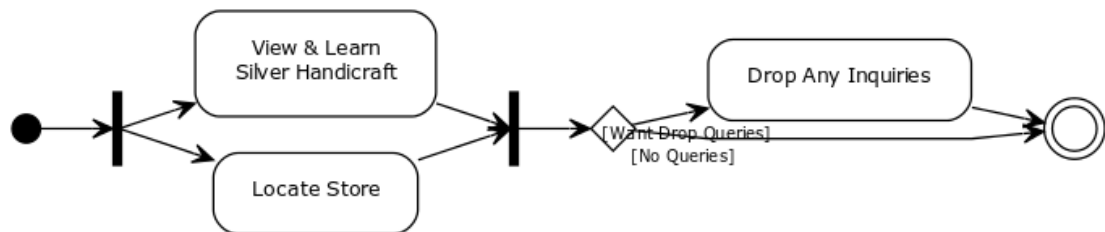


Figure 17: Activity Diagram from User Point of View

From user point of view, the mobile application flow of control started with the user to choose whether to view and learn silver handicraft or/and locate store. Next, if the user has any question or inquiry he/she can drop the query on the provided query dropping section. However, the flow is not rigid and the user may navigate and access any of the mobile application functionalities randomly.

##### Activity Diagram (Admin View)



Figure 18: Activity Diagram from Admin Point of View

Meanwhile, from the admin point of view, the admin need to first login with the authentic combination of username and password before the admin can be authorized to access the admin level to manage user inquiries.



## 4.3 House of Silver Mobile Application Development

### 4.3.1 Mobile Application Graphical User Interface (GUI)

Following is the Graphical User Interface (GUI) of the HOSAPP Mobile Application.

#### #1 Interface : Homepage



Figure 19: HOSAPP Mobile Application Interface (Home)

Figure above is the snapshot of the HOSAPP mobile application home page. The HOSAPP mobile application has five main functions (buttons) as per illustrated in figure above. As user clicked one of the function buttons, user will be redirect to the respective function page.

Main functions:

1. About Us
2. Silver Information
3. Our Showcase
4. Contact Us
5. Admin Login

## #2 Interface : About Us



Figure 20: HOSAPP Mobile Application Interface (About Us)

Once the user clicked on the About Us button located in the Homepage, the user will be redirect to the About Us page as illustrated above. The About Us page is displaying on House of Silver company background information.

## #3 Interface : Silver Information

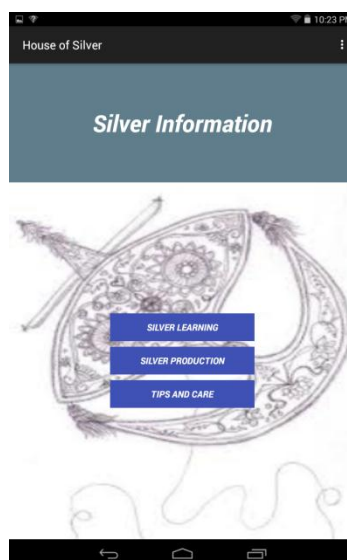


Figure 21: HOSAPP Mobile Application Interface (Silver Information)

Next, above figure is the Silver Information page. On the page, there will be three category of silver information related that will cover on Silver Learning, Silver Production (video footages of silver production) and lastly Tips and Silver-care. Each of these buttons will redirect user to its page displaying the related content according to the title. The content of each domain are viewed in a single scroll-able page as shown below.

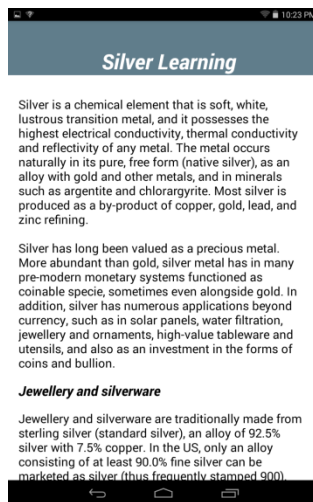


Figure 22: Silver Learning Interface

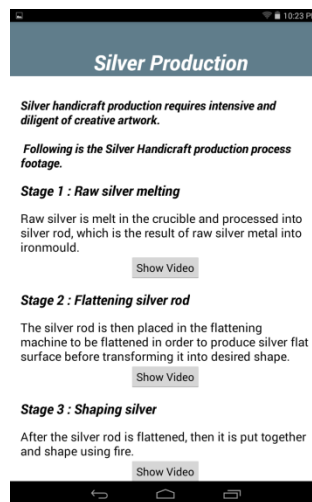


Figure 23: Silver Production Interface

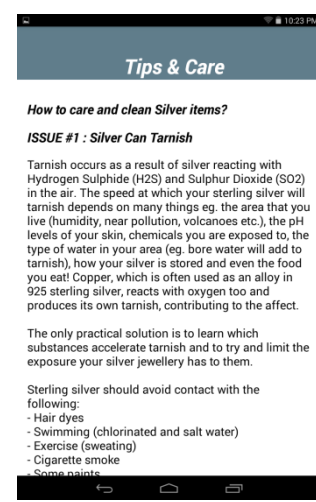


Figure 24: Silver Tips & Care Interface

#### #4 Interface : Our Showcase

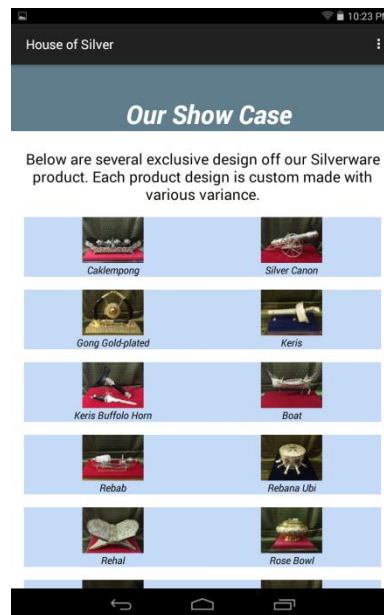


Figure 25: HOSAPP Mobile Application Interface (Our Showcase)

Moreover, above is the company merchandise showcase interface. This interface section will display several chosen silver merchandise of the company. However, the showcase is only to display the merchandise before the functionality of online purchase. Plus, each of the images are enlarge-able just by clicking on it.

#### #5 Interface : Contact Us

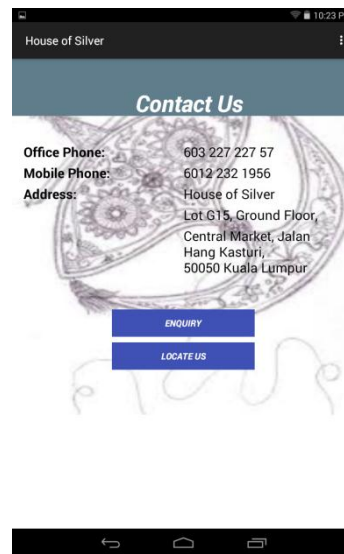


Figure 26: HOSAPP Mobile Application Interface (Contact Us)

Furthermore, interface above is a section that will display the contact information of the company. Besides, it is also has the functionality that allow users to drop any enquiries they have pertaining on the silver handicraft business directly to the vendor just by clicking the “Enquiry” button. In addition, users can also locate the House of Silver store location on a map just by clicking on the “Locate Us” button. Then the user will be redirected to a page displaying a static map location of the House of Silver store. Below is the screenshot of the Locate Us interface.

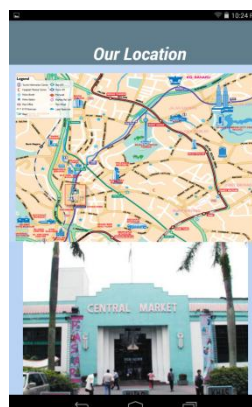


Figure 27: Locate Us Interface

#### #6 Interface : Enquiry

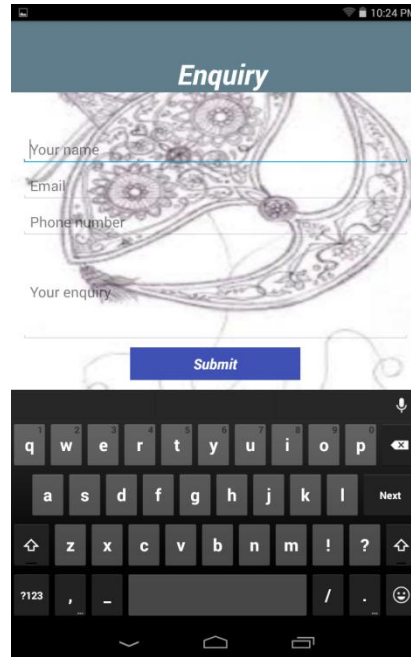


Figure 28: HOSAPP Mobile Application Interface (Enquiry)

Next, above interface is the extended of Contact Us interface in which the user will be redirect to this page once they click on the Enquiry button located at the Contact Us page. In this interface section, users can drop their queries directly to the business owner who is expert in silver-related. Their query then will be replied by the vendor (admin) to the email address or through phone call.

### #7 Interface : Admin Login

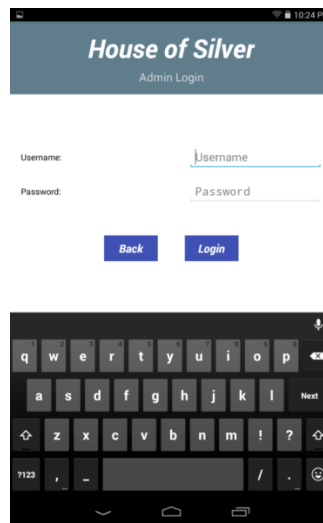


Figure 29: Admin Login Interface

Lastly, the last functionality is the admin login. Above screenshot is the interface of Admin login. The login page is only applicable to admin in which upon login with the authentic username and password, the admin will be redirect to a page viewing a data of user enquiries. The admin will have the authority to manage and delete the enquiry data. Below screenshot shows the interface that displaying the entire user enquiries from the database.

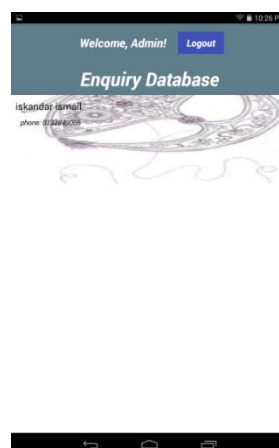


Figure 30: Enquiry Database Interface

### 4.3.2 User Centred Design Adoption in Interface Design

As discussed in literature review section earlier, the User Centred Design philosophy is adopted in the designation and development of the mobile application. There are three user centred design principles have been followed namely navigation aids, simplicity & consistency and direct access to information.

#### Navigation Aids

This principle is refers to the ease of user to navigate throughout the mobile application. To have a clear and easy navigation, the House of Silver mobile application is developed with a clear instruction buttons that navigate user throughout the mobile application. In addition, the user can easily return to the previous page easily with just clicks on the back button embedded on the Android-based smartphone.

Below are several screenshots of House of Silver mobile application user interfaces that consist of clear and easy navigation buttons.

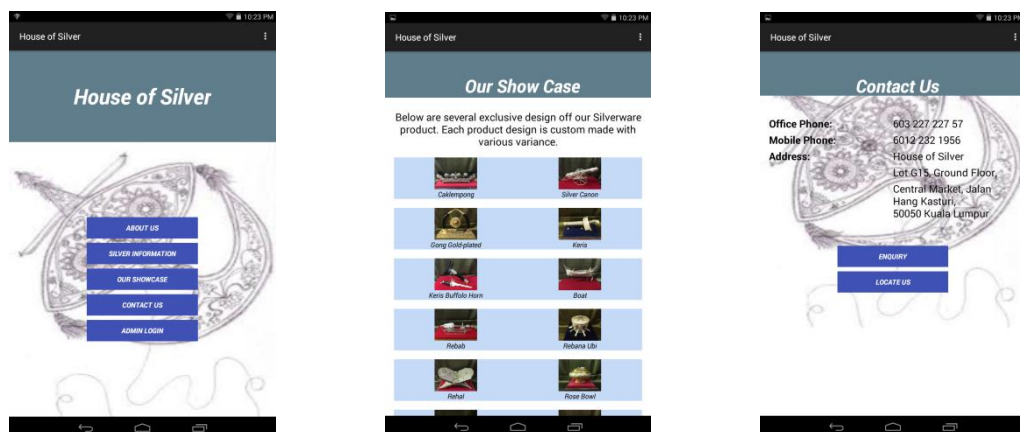


Figure 31: Sample of Navigation Aids



## **Simplicity & Consistency**

The next User Centred Design principle that has been applied in the development of HOSAPP mobile application is simplicity and consistency. This principle dictates the simplicity and consistency of the structure of the House of Silver mobile application. For instance, all the buttons are designed with similar attributes (ie. Color and size) and placed at a consistent section that ease user to look up for it. Besides, the background and colour of each page are consistent and the selection is based on a corporate point of view that is in a simple and appropriate theme.

## **Direct Access to Information**

Lastly, the final principle of User Centred Design adopted in the mobile application development is direct access to information. This principle is refers to the fewer number of clicks to access intended information. As such, the House of Silver mobile application was developed with the nature that the information and each feature is reachable within a few number of clicks (maximum of 4 clicks).

As illustrated below, user can access to the House of Silver showcase with a single click.

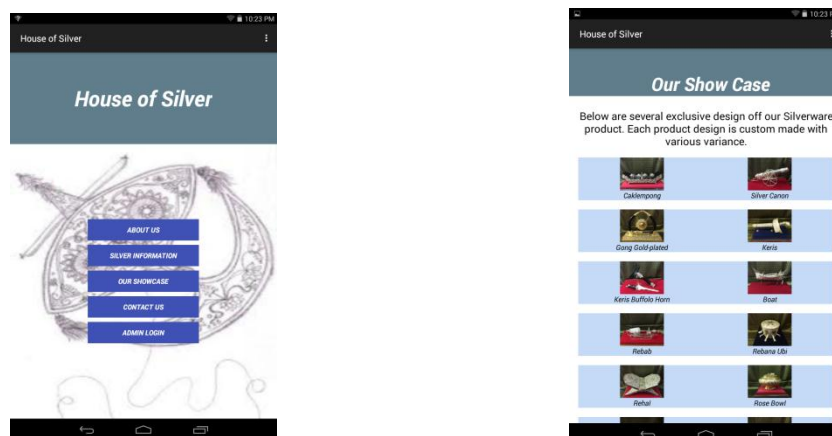


Figure 32: Sample of Direct Access to Information Principle

### **4.3.3 HOSAPP Mobile Application Main Functionalities**

- I. Taxonomy of Silver Handicraft Knowledge Information
  - A static display screen of knowledge sharing on silver handicraft that cover various areas included the basis information of silver handicraft knowledge, the process of silver handicraft production and as well as the tips on silver handicraft care.
  - All this knowledge information has been categorize to ease user on retrieving and accepting the knowledge sharing.
  - The silver knowledge information also included the silver handicraft production video footage.
- II. House of Silver Product Showcase
  - A viewing on simple catalogue of several House of Silver (HOS) silverware products.
  - All silverware products are displayed in zoom-able images and are not meant for online sales.
- III. User Enquiry Form
  - User is provided with an enquiry dropping form function in which the user can drop any enquiry to the vendor on any matters pertaining silverware business.
  - The enquiry form can be found at the Contact Us tab.
- IV. Locate Store Location
  - This functionality is to provide a static close-up map of direction to the House of Silver store location.

V. Admin Login/Access

- A login access interface provided to admin only for the user enquiries management purposes.
- Upon login with the authentic username and password, admin will be redirected to the database of user enquiries.
- Admin will able to view and manually response to each of the user enquiry as well as able to delete unneeded (out-dated) enquiries.

#### **4.3.4 Tools and Equipment Used**

##### Hardware

- Smartphone with Android platform : to run the mobile application
- Personal laptop : to develop the mobile application
- Printer: used to print the interim report and project related documents.

##### Software

- Microsoft Office Word: Used to compile and prepare the project reports.
- Android Studio
- yUML beta v0.18: Used to create the use case and activity diagrams

#### 4.4 Mobile Application Testing Results

Several testing has been done on the House of Silver mobile application (HOSAPP) to validate and ensure the mobile application is running successfully and meeting all the stakeholders' requirements.

##### 4.4.1 Functionality Testing

Functions	Expected Outcome	Testing Frequency	Testing Result	
			Success	Failure
About Us Button	Redirect to about us section	10	10	0
Silver Information Button	Redirect to Silver Info Section	10	10	0
Our Showcase Button	Redirect to Our Showcase to view Merchandise	10	10	0
Zoom Merchandise Images	Click to zoom-in merchandise Image	10	7	3
Contact Us Button	Redirect to Contact Us Section	10	10	0
Drop Inquiries	User to drop any inquiries	10	7	3
Locate Store	Redirect to HOS map image	10	8	2
Admin Login	Login & redirect to admin access page	10	6	4
Delete Inquiries	Admin access to delete user inquiries	10	8	2

Figure 33: Table of Functionality Testing Results

The functionality testing is done solely by the developer to test and validate each of the House of Silver mobile application functionalities. This testing is to validate and ensure all the functionalities are successfully running before proceed to user acceptance testing. The results of the functionality testing are illustrated in table form above. Each of the functionalities is tested ten times

#### 4.4.1 User Acceptance Testing

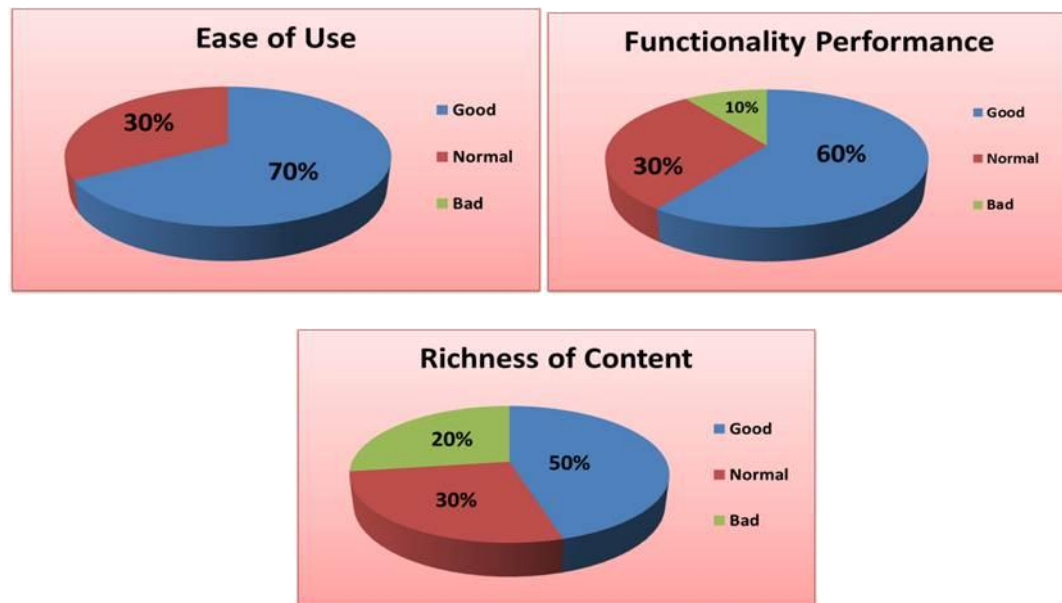


Figure 34: Pie charts of User Acceptance Testing Results

Upon completing the Functionality Testing, the House of Silver mobile application is then further tested with User Acceptance Testing (UAT). The UAT is conducted on 10 different users to collect their feedbacks while using the HOSAPP mobile application. The users' feedbacks are collected to test and validate on three aspects namely 1.Ease of Use, 2.Functionality Performance, and 3.Richness of Content.

The results of the user acceptance testing are recorded and illustrated in pie chart form as displayed above. With these valuable feedbacks, the House of Silver mobile application is then can be improvised before proceed to deployment and commercialization phase.

On the other hand, the user acceptance testing is also conducted to test and validate on the adopted User Centred Design principles that have been applied in the House of Silver mobile application design and development.

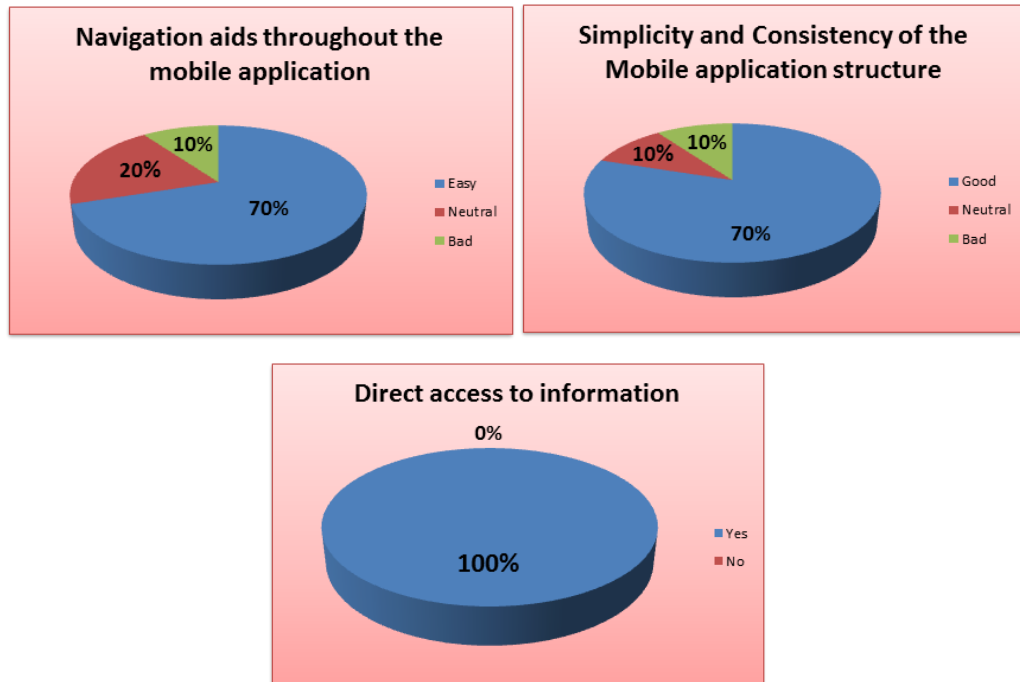


Figure 35: Pie charts of User Acceptance Testing Results (User Centred Design)

The results obtained show that the majority of the tested users agreed that the User Centred Design elements have been applied in the development of the House of Silver mobile application.

## **Chapter 5 Conclusion and Recommendations**

### **5.0 Conclusion**

As conclusion, House of Silver Mobile Application (HOSAPP) is expected to be significantly contributed to the growth of House of Silver business process. The project will help to create awareness on the silver handicraft value and history among the vendor targeted market. In addition, it is also beneficial to the consumers as they able to learn silver handicraft conveniently by only downloading and exploring the mobile application. Lastly, the study is expected to be the kick-off of more future invention by optimizing the usage of mobile application in any further wide perspective.

### **5.1 Recommendations**

For future works, the House of Silver mobile application (HOSAPP) can be further enhance and extend to serve the vendor (House of Silver) better. One of the enhancement can be done is to upgrade the HOSAPP mobile application with E-Commerce functionality which enable House of Silver to sell their silver product online and serve greater potential market. Moreover, expanding the mobile application operating system platform can be included as an ideal future works in order to expand the HOSAPP mobile application platform (ie: IOS, Blackberry and etc.) so that it can reach the whole smartphone users regardless of different operating system platform.

## Appendix

### Survey Questionnaire

I am conducting a survey for my current Final Year Project. The project is titled "House of Silver Mobile Application". It is basically a knowledge sharing mobile application that provides knowledge on history and value of silver handicraft. The main objective of the mobile application is to create awareness among current consumers toward the silver handicraft. It is also an initiative to boost up a niche silver handicraft retailer; House of Silver sales and marketing. Your cooperation in this survey is highly appreciated.

**\*Required**

**Gender \***

- ☐ Male
- ☐ Female

**Age \***

- ☐ <21 years old
- ☐ 21 - 25 years old
- ☐ 26 - 30 years old
- ☐ 31 - 45 years old
- ☐ > 45 years old

**Do you own a smartphone? \***

- ☐ Yes
- ☐ No

**What is your preferred smartphone OS platform? \***

- ☐ Android
- ☐ iOS
- ☐ Other:



**Do you agree that mobile application should be leverage by businesses to promote their business? \***

- ☐ Yes
- ☐ No

**Do you have ever purchased any silver merchandise? \***

- ☐ Yes
- ☐ No

**Do you had ever exposed or learn about the history and value of silver handicraft? \***

- ☐ Yes
- ☐ No

**Would you be interested in learning about silver handicraft knowledge? \***

- ☐ Yes
- ☐ No

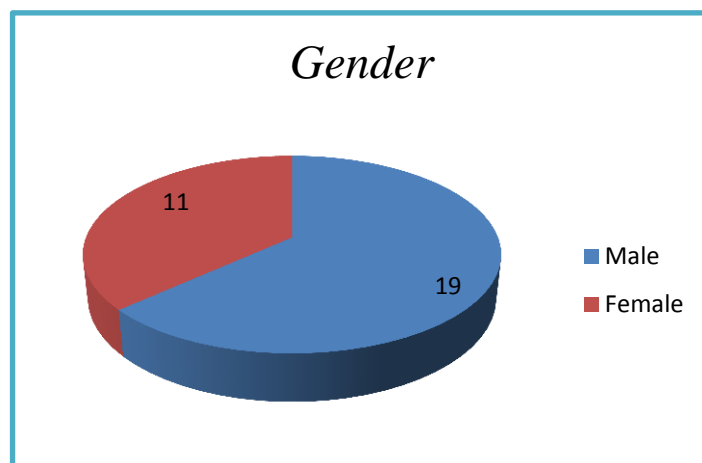
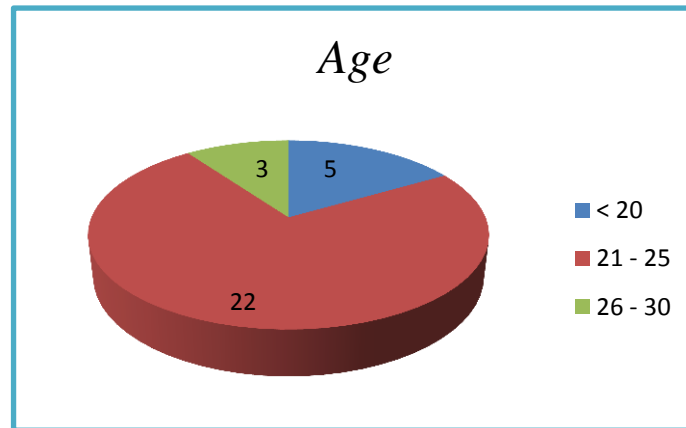
**If there is a Mobile Apps that sharing knowledge about silver handicraft, will you be interested in using it? \***

- ☐ Yes
- ☐ No

**What will be your expectation toward the mobile application (HOSAPP)? \***

- ☐ Provide more on silver handicraft knowledge
- ☐ Attractive Interface
- ☐ E-commerce
- ☐ Neutral

Survey Demographic Information Results



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